

RESTRICTED

T. O. NO. 02-1-38

*"OK" Memphis, Tenn.  
T.O. Clerk ~~act~~*

## ENGINES AND MAINTENANCE PARTS

# USE OF ALTERNATE GRADE FUEL

## AIRCRAFT ENGINES

**NOTE** The work directed in paragraph 2. will be accomplished as specified by service activities with the aid of base maintenance facilities, if necessary. Commanding Officers will be responsible that the contents of this Technical Order are brought to the attention of all pilots cleared for operation of the aircraft listed in the table A. This Technical Order contains specific instructions for pilots and should be available for transition flying as contemplated in AAF Regulation 50-16. The AAF Resident Representative of contractor's plants or modification centers will be responsible to see that one copy of this Technical Order is placed in the back of the affected Pilot's Handbook of Flight Operating Instructions, carried in the aircraft specified in this Technical Order, prior to delivery of the aircraft to the Army Air Forces. The base or station Air Inspector, Technical, will be responsible to see that a copy of this Technical Order is placed in aircraft previously delivered to the Army Air Forces.

This Technical Order replaces T. O. Nos. 02-1-38 dated 14 January 1944, and 02-1-38C dated 30 April 1944.

**NOTICE:** This document contains information affecting the national defense of the United States within the meaning of the Espionage Act, 50 U. S. C., 31 and 32, as amended. Its transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.

RESTRICTED

11 AUGUST 1944



## THIS PUBLICATION MAY BE USED BY PERSONNEL RENDERING SERVICE TO THE UNITED STATES OR ITS ALLIES

### Instructions Applicable to AAF Personnel.

Paragraph 5.d. of Army Regulation 380-5 relative to the handling of restricted printed matter is quoted below:

"d. Dissemination of restricted matter.—The information contained in restricted documents and the essential characteristics of restricted material may be given to any person known to be in the service of the United States and to persons of undoubted loyalty and discretion who are cooperating in Government work, but will not be communicated to the public or to the press except by authorized military public relations agencies."

### Instructions Applicable to Navy Personnel.

Navy Regulations, Article 75½, contains the following paragraphs relating to the handling of restricted matter:

"(b) Restricted matter may be disclosed to persons of discretion in the Government service when it appears to be in the public interest."

"(c) Restricted matter may be disclosed, under special circumstances, to persons not in the Government service when it appears to be in the public interest."

The Bureau of Aeronautics Circular Letter No. 12-43 further states:

"Therefore, it is requested that all naval activities check their own local regulations and procedures to make sure that handbooks, service instructions and other restricted technical publications are actually being made available to both civilian and enlisted personnel who have use for them."

### General.

These instructions permit the issue of restricted publications to civilian contract and other accredited schools engaged in training personnel for Government work, to civilian concerns contracting for overhaul and repair of aircraft or aircraft accessories, and to similar commercial organizations.

## LIST OF REVISED PAGES ISSUED

NOTE: A heavy black vertical line, to the left of the text on revised pages, indicates the extent of the revision. This line is omitted where more than 50 percent of the page is revised.

### ADDITIONAL COPIES OF THIS PUBLICATION MAY BE OBTAINED AS FOLLOWS:

**AAF ACTIVITIES.**—Submit requisitions through the Air Inspector, Technical, whenever practicable, in accordance with T. O. No. 00-25-3 to the Commanding General, Fairfield Air Service Command, Patterson Field, Ohio. Attn: Publications Distribution Branch, as outlined in AAF Regulation 5-9. For details of Technical Order distribution, see T. O. No. 00-25-3.

**NAVY ACTIVITIES.**—Submit requests to the Chief, Bureau of Aeronautics, Navy Department, Washington, D. C. Also, see NavAer 00-500 for details on distribution of technical publications.

**BRITISH ACTIVITIES.**—Submit requirements on Form 294A, in duplicate, to the Air Publications and Forms Store, New College, Leadhall Lane, Harrogate, Yorkshire, England.



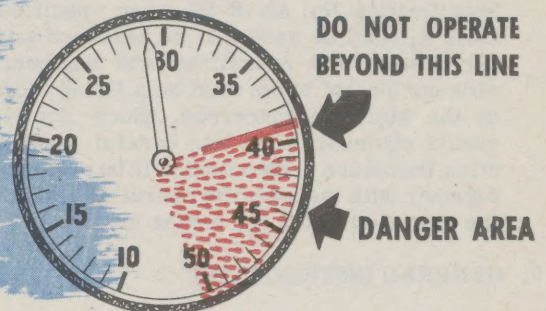
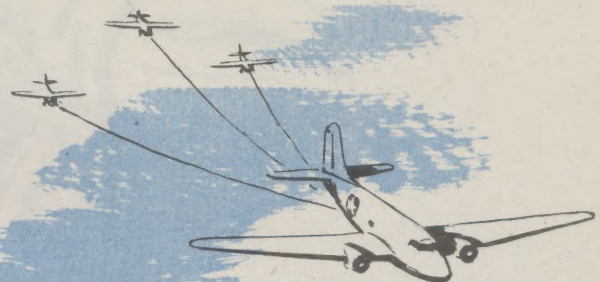
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## 1. PURPOSE.

To conserve a maximum of 100-octane fuel, every effort will be made to operate all types of aircraft in accordance with the following instructions:

a. All aircraft and engine combinations which require and are serviced with 100-octane fuel will be operated at all times using the most economical power and cruising conditions.



b. All aircraft and engine combinations listed in table A will use fuel, grade 91, Specification No. AN-F-26, in lieu of fuel, grade 98/130, Specification No. AN-F-27, grade 100/130, Specification No. AN-F-28, or grade 100, Specification No. AN-VV-781, amendment 4 or 5, for all flying missions within the continental limits of the United States except for the following missions:

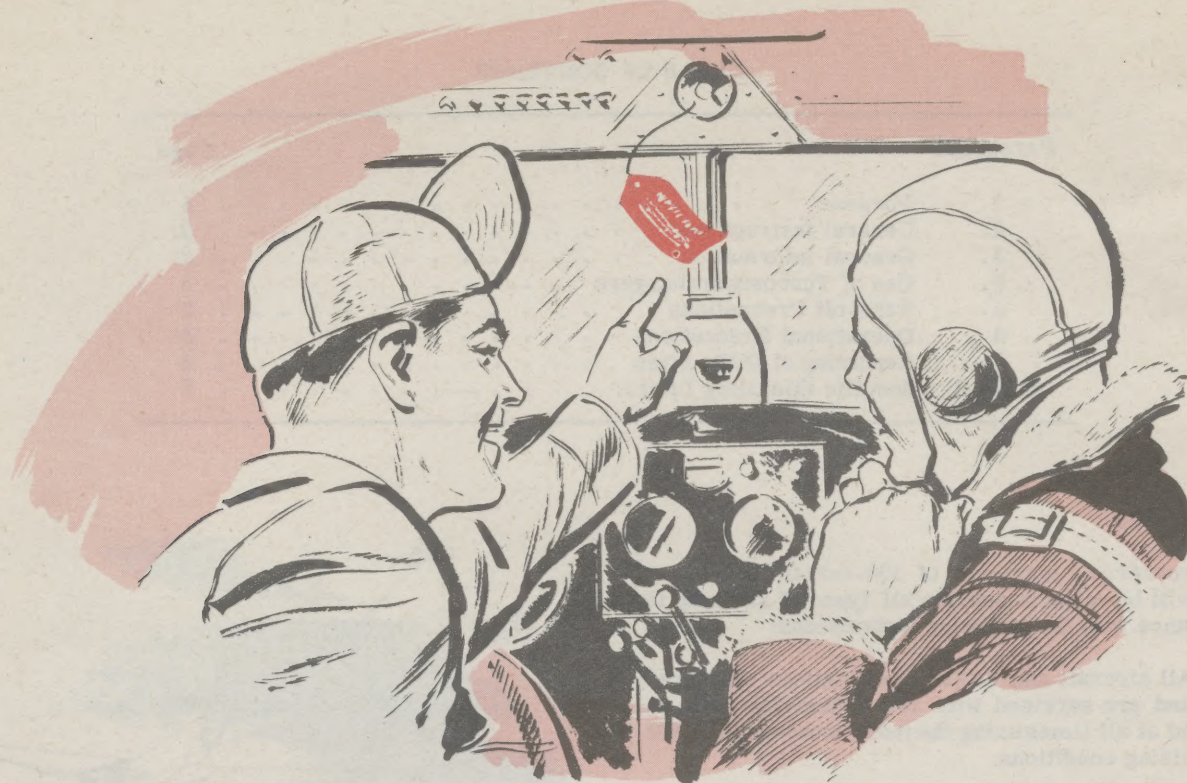
(1) All extended missions over salt water, such missions to include coastal patrol operations, where load, distance, and safety, in the joint opinion of the

responsible operations and engineering officers (one of whom must be a flying officer) precludes the use of fuel, grade 91, Specification No. AN-F-26.

(2) Operation involving airplanes being finally staged for overseas flight.

(3) Operations involving glider and target towing only when excessive engine operating temperatures are encountered with the use of fuel, grade 91, Specification No. AN-F-26.





(4) Missions which cannot be performed in accordance with the specific operation limits listed in table A for the type of aircraft and engine combination involved.

**NOTE** The final decision relative to whether or not a grade of fuel higher than grade 91, Specification No. AN-F-26, when specified in table A, shall be used will be based on a joint decision by the operations and engineering officers (one of whom must be a flying officer) of the stations concerned. Such decisions should obviously take into careful consideration the nature of the mission to be performed, together with the specific operating limits for the type of aircraft and engine involved.

## 2. GENERAL INSTRUCTIONS.

Emphasis is placed on the fact that the type of operation described herein is to be accomplished only with fuel meeting the requirements of Specification No. AN-F-26 and will in no case be used where fuel, grade 91, Specification No. AN-VV-776, only is available, nor will any operation in accordance with table A be attempted on any mixture of these two specifications of grade 91 fuel. It is permissible, when occasions demand, to mix fuels of grade 91, Specification No. AN-F-26, and grades 98/130 or 100/130, Specification No. AN-F-27 or AN-F-28; however, in any such cases the fuel mixture will be considered to be the lower grade and all operations will be in accordance with the operating instructions for the lower grade of fuel. Pilots on cross-country flights will always ascertain the type of fuel serviced in their aircraft. In addition, engines equipped with two-speed integral superchargers will normally be operated in

the low blower ratio. High blower ratio will be used only during daily ground and flight inspections to prevent sludging of the supercharger clutch, or at altitudes where it is necessary to obtain the power conditions specified in table A. Activities in doubt as to the specification and grade of fuel available for servicing the applicable aircraft, or who do not have sufficient fuel, grade 91, Specification No. AN-F-26, to comply with these instructions will contact Headquarters, Air Service Command, by teletype, Attention: Supply Division, Fuels and Lubricants Branch, ASCSE3, for specification identification of fuel which has been furnished or for information as to additional supply.

**CAUTION** Applicable aircraft listed in table A serviced with fuel, grade 91, Specification No. AN-F-26, will have a red warning tag of local manufacture bearing the following notation secured conspicuously on the control column or ignition switch: Warning to Pilot. - This Airplane Serviced With Fuel, Grade 91, Specification No. AN-F-26. Operate Engine (or Engines) Within the Following Limits Prescribed by T. O. No. 02-1-38. (List all operating limits for particular aircraft.)

The limits to be placed on the Red Warning Tag will be those for the particular airplane shown in table A of this Technical Order. The following sample Red Warning Tag is for guidance only:

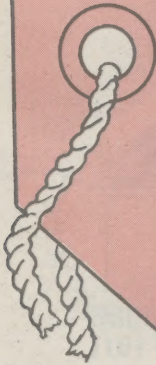
## 3. GENERAL INFORMATION.

The aircraft and engine combinations listed in table A will be operated on fuel, grade 91, Specification No. AN-F-26, in accordance with the specific operating instructions contained in table, except when missions



## C-49E AIRPLANE R-1820-G102A ENGINES

**Warning to Pilot—This Airplane is Serviced With Fuel, Grade 91, Specification No. AN-F-26. Operate Engines Within the Following Indicated Limits Prescribed in T. O. No. 02-1-38.**



	HP	RPM	M.P. IN.HG	MIXTURE SETTING
TAKE-OFF OR MAX CONDITION OF OPERATION	1100	2350 (MAX)	43.0 (MAX)	AUTO-RICH
NORMAL RATED POWER	900	2300 (MIN)	35.0 (MAX)	AUTO-RICH
MAX CRUISING	675	2020 (MIN)	32.0 (MAX)	AUTO-RICH
DESIRED CRUISING	500	1700 (MIN)	25.5 (MAX)	AUTO-LEAN

are within the scope of exceptions listed in paragraph 1. Emphasis is placed on the fact that the specific operating instructions in the table apply specifically to the aircraft engines by model number and the aircraft by type only. It will be the responsibility of all pilot and servicing personnel to determine the type and model numbers of engines installed in aircraft to insure compliance with these operating instructions.

#### 4. USE OF TURBOSUPERCHARGERS.

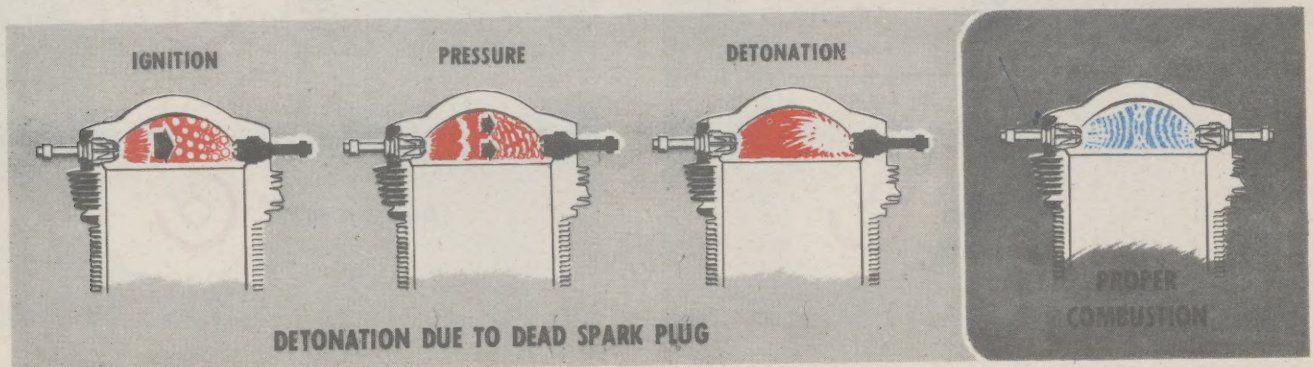
All types of airplanes except P-38 series (for P-38 series see T. O. No. 02-5A-66) which are equipped with turbosuperchargers have a separate cockpit supercharger control. The use of the turbosupercharger is authorized at any time it is necessary to obtain manifold pressure for a given set of flight conditions up to the maximum manifold pressures permitted in table A.

#### 5. TAKE-OFF PRECAUTIONS.

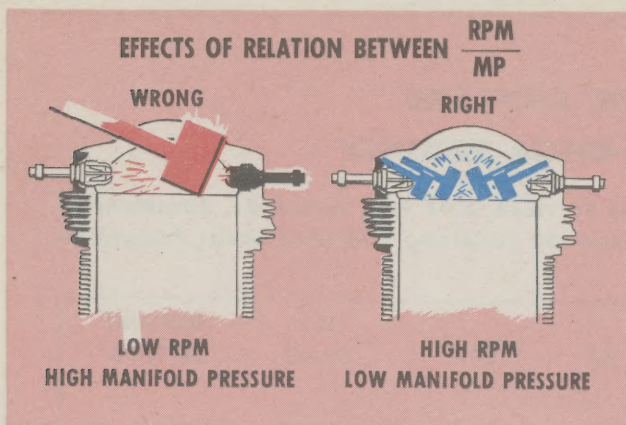
The lightest loads possible will be carried when operating aircraft in accordance with instructions in table A. Take-off with normal load may not be possible with all aircraft with the restrictions imposed.

#### 6. OPERATIONAL PRECAUTIONS.

The principal concern of operating personnel is necessarily the tendency of engines to detonate when operating on fuel of a different-grade than that for which the engine was designed. Special care must be taken to see that all spark plugs are operating. The result of one spark plug being inoperative is to cause detonation which will develop into preignition on that side of the piston where the dead spark plug is installed. High heat resulting from preignition will aggravate any tendency of the piston rings to disintegrate and cause scoring of the cylinder walls and piston skirt with the resulting failure of the piston. Operating personnel will be familiar with the relationship of manifold pressure versus engine revolutions and it should be particularly borne in mind that the specific operating instructions listed in table A for cruising conditions are the minimum rpm and the maximum manifold pressure for a given horsepower output. If the rpm is increased and the manifold pressure reduced, the engine is being operated under a condition more favorable to long engine life. Fuel consumption will be increased appreciably by the increase in rpm.

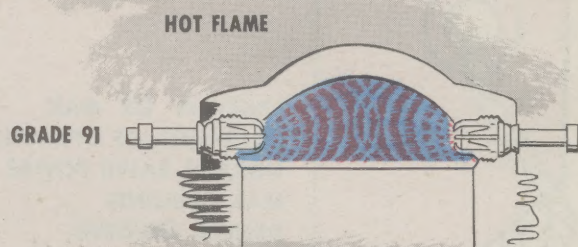
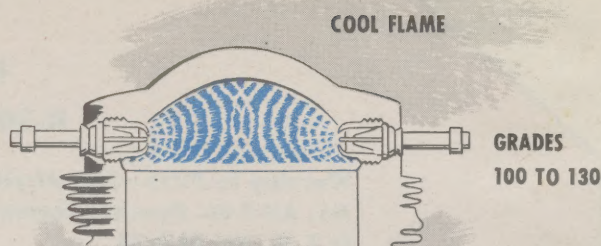




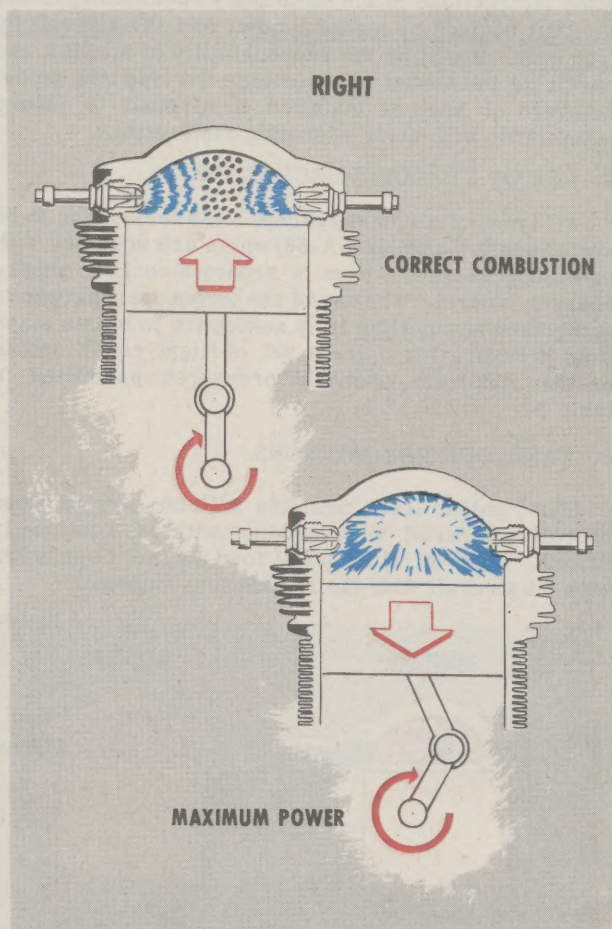
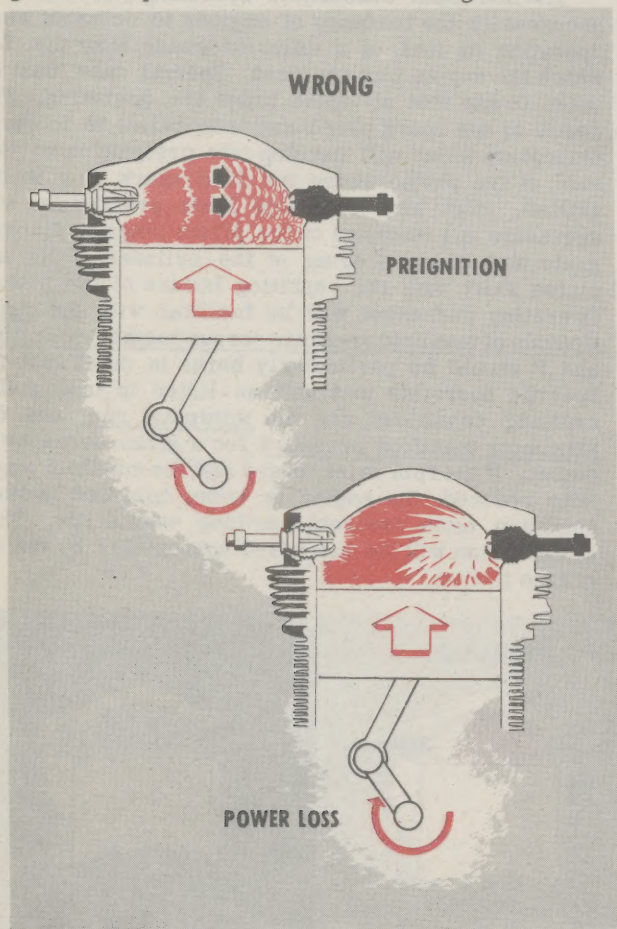


## 7. REPORTING OF DIFFICULTIES.

The operating conditions specified herein are the safest which can be reasonably used without involving recalibration of the engines, reworking of carburetors, or other time-consuming changes. Service activities experiencing any type of failures or maintenance difficulties which might be attributable to the use of fuel, Specification No. AN-F-26, grade 91, will submit an Unsatisfactory Report on the condition, describing in detail the trouble being experienced and stating the grade and specification of the fuel being used.



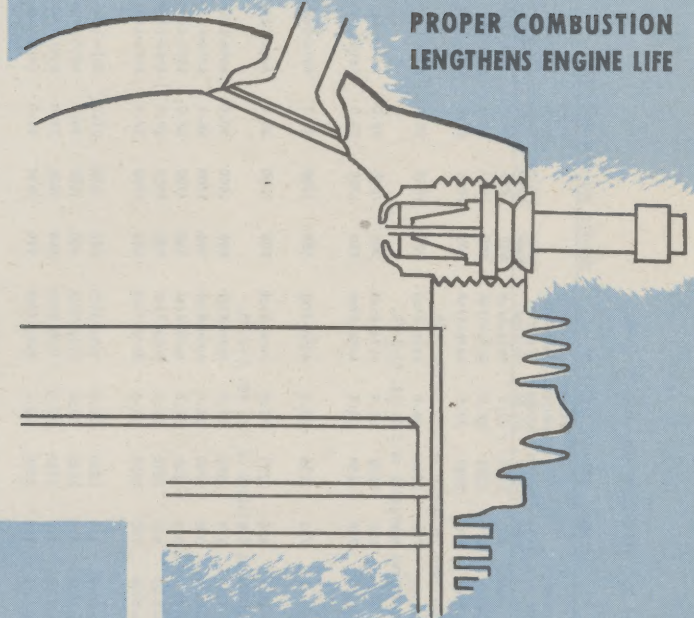
**RELATIVE COMBUSTION TEMPERATURES  
FOR DIFFERENT GRADES OF FUEL**





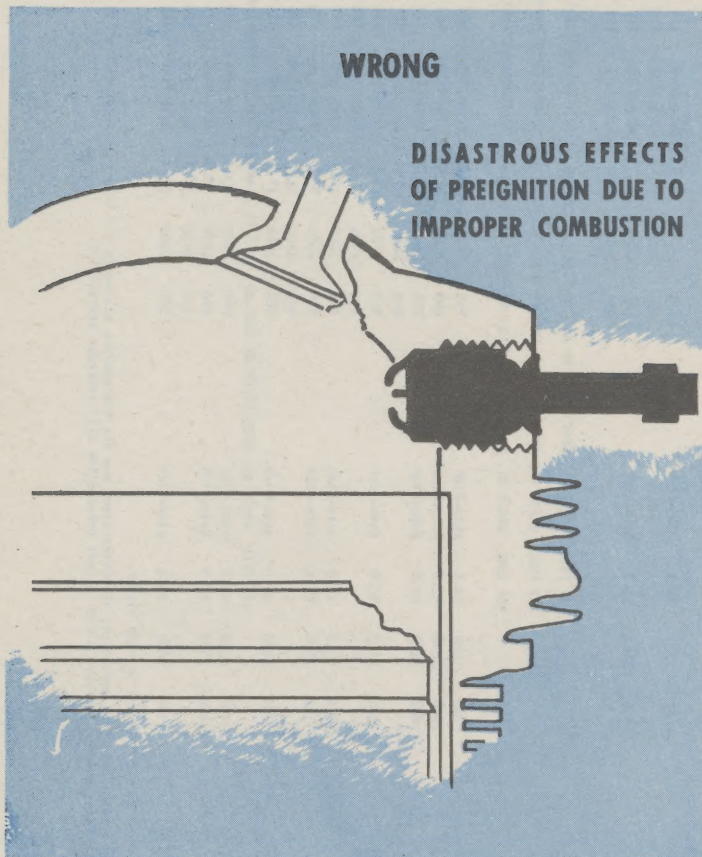
**RIGHT**

**PROPER COMBUSTION  
LENGTHENS ENGINE LIFE**



**WRONG**

**DISASTROUS EFFECTS  
OF PREIGNITION DUE TO  
IMPROPER COMBUSTION**



SEE TABLES ON  
FOLLOWING PAGES

By Command of General ARNOLD:

Prepared by Engine Section,  
Maintenance Div, Hq, ASC.

DELMAR H. DUNTON,  
Major General, U. S. A.,  
Commanding General, Air Service Command.



TABLE A  
CONDITIONS FOR OPERATION USING FUEL, GRADE 91, SPECIFICATION NO. AN-F-26

TAKE-OFF OR MAXIMUM CONDITION OF OPERATION				NORMAL RATED POWER				MAXIMUM CRUISING CONDITION				DESIRED CRUISING CONDITION				COMMENTS			
Engine Designation	Installed Aircraft Designation	Horse Power	Maximum Manifold Pressure, In. Hg.	Carburetor Mixture Setting	Horse Power	Minimum R.P.M.	Maximum Manifold Pressure, In. Hg.	Carburetor Mixture Setting	Horse Power	Minimum R.P.M.	Maximum Manifold Pressure, In. Hg.	Carburetor Mixture Setting	Horse Power	Minimum R.P.M.	Maximum Manifold Pressure, In. Hg.		Carburetor Mixture Setting		
R-1830-13	P-36	1050	43.0	Auto-Rich	900	2550	34.0	Auto-Rich	650	2550	27.0	Auto-Rich	450	1650	29.0	Auto-Lean	(Single Speed Blower)		
	-17	1100	43.0	Auto-Rich	1000	2550	43.0	Auto-Rich	825	2230	36.0	Auto-Rich	500	1650	30.0	Auto-Lean	(Single Speed Blower)		
	-21	1100	43.0	Auto-Rich	1000	2550	38.6	Auto-Rich	670	2230	27.5	Auto-Rich	500	1650	30.0	Auto-Lean	(Single Speed Blower)		
	-33			USE FUEL, GRADE 91, SPECIFICATION NO. AM-F-26, ACCORDING TO INSTRUCTIONS CONTAINED IN T. O. NO. 01-5-75.															
	-35	P-43	1100	43.0	Auto-Rich	1000	2550	43.0	Auto-Rich	825	2230	36.0	Auto-Rich	500	1650	30.0	Auto-Lean	(Single Speed Blower)	
	-43	B-24, C-87	1100	43.0	Auto-Rich	1000	2550	43.0	Auto-Rich	825	2230	36.0	Auto-Rich	500	1650	30.0	Auto-Lean	(Single Speed Blower)	
R-1830-90C	P-43	1175	43.0	Auto-Rich	1050	2550	42.0	Auto-Rich	790	2250	34.5	Auto-Rich	550	1700	32.5	Auto-Lean	(Single Speed Blower)		
	-51																		
		1175	46.0	Auto-Rich	1050	2550	42.0	Auto-Rich	790	2250	34.5	Auto-Rich	550	1700	32.5	Auto-Lean	(Single Speed Blower)		
		1100	43.0	Auto-Rich	1000	2550	43.0	Auto-Rich	825	2230	36.0	Auto-Rich	500	1650	30.0	Auto-Lean	(Single Speed Blower)		
R-2000-3	P-43	1100	2700	43.0	Auto-Rich	1000	2550	38.6	Auto-Rich	670	2230	27.5	Auto-Rich	500	1650	30.0	Auto-Lean	(Single Speed Blower)	
	-65	B-24	1100	2700	43.0	Auto-Rich	1000	2550	42.0	Auto-Rich	790	2250	34.5	Auto-Rich	550	1700	32.5	Auto-Lean	(Single Speed Blower)
	-67	A-28	1175	2700	46.0	Auto-Rich	1050	2550	43.0	Auto-Rich	825	2230	36.0	Auto-Rich	550	1700	32.0	Auto-Lean	(Low Blower)
	-82	C-48	1125	2700	43.0	Auto-Rich	1000	2550	36.0	Auto-Rich	610	2230	26.0	Auto-Rich	400	1650	24.0	Auto-Lean	(High Blower)
	-92	C-47, C-48, C-53	1175	2700	46.0	Auto-Rich	1050	2550	42.0	Auto-Rich	790	2250	34.5	Auto-Rich	550	1700	32.5	Auto-Lean	(Single Speed Blower)
R-2000-3	C-54	(1200)	2700	43.5	Auto-Rich	900	2550	35.0	Auto-Rich	610	2230	27.8	Auto-Rich	450	1650	27.0	Auto-Lean	(Low Blower)	
	-7	(1200)	2700	43.5	Auto-Rich	900	2550	35.0	Auto-Rich	610	2230	27.8	Auto-Rich	450	1650	27.0	Auto-Lean	(Low Blower)	
R-2800-21	P-47																		
R-2800-31	B-34																		
R-2800-51	C-46																		
SR-1820-30 DC-2		790	1950	33.5	Auto-Rich	750	1950	32.0	Auto-Rich	560	1700	27.0	Auto-Rich	375	1270	22.0	Auto-Lean	(Single Speed Blower)	
	B-17	1000	2200	42.0	Auto-Rich	800	2100	36.5	Auto-Rich	600	1840	32.0	Auto-Rich	400	1365	27.0	Auto-Lean	(Single Speed Blower)	
	-52	A-24	(1000)	2350	41.0	Auto-Rich	950	2300	37.0	Auto-Rich	710	2020	30.0	Auto-Rich	425	1500	27.0	Auto-Lean	(Low Blower)
	-53	B-18	(1000)	2200	40.0	Auto-Rich	800	2300	35.5	Auto-Rich	600	2020	28.0	Auto-Rich	400	1500	26.0	Auto-Lean	(High Blower)
	-57	Q-47	1060	2350	42.0	Auto-Rich	860	2100	35.0	Auto-Rich	645	1840	30.0	Auto-Rich	430	1365	27.0	Auto-Lean	(Low Blower)
	-60	A-24	(1100)	2550	42.0	Auto-Rich	850	2100	38.0	Auto-Rich	640	1840	31.0	Auto-Rich	425	1365	27.0	Auto-Lean	(High Blower)
R-1820-51		1100	2500	43.5	Auto-Rich	900	2300	37.0	Auto-Rich	675	2020	31.0	Auto-Rich	450	1430	27.0	Auto-Lean	(Single Speed Blower)	
	B-17	1060	2350	42.0	Auto-Rich	860	2100	35.0	Auto-Rich	645	1840	30.0	Auto-Rich	430	1365	27.0	Auto-Lean	(Low Blower)	
	-52	A-24	(1100)	2550	42.0	Auto-Rich	850	2100	38.0	Auto-Rich	640	1840	31.0	Auto-Rich	425	1365	27.0	Auto-Lean	(High Blower)
	-53	B-18	(1000)	2200	40.0	Auto-Rich	800	2300	35.5	Auto-Rich	600	2020	28.0	Auto-Rich	400	1500	26.0	Auto-Lean	(High Blower)
	-57	Q-47	1060	2350	42.0	Auto-Rich	860	2100	35.0	Auto-Rich	645	1840	30.0	Auto-Rich	430	1365	27.0	Auto-Lean	(Low Blower)
	-60	A-24	(1100)	2550	42.0	Auto-Rich	850	2100	38.0	Auto-Rich	640	1840	31.0	Auto-Rich	425	1365	27.0	Auto-Lean	(High Blower)
R-1820-51		1100	2500	43.5	Auto-Rich	900	2300	37.0	Auto-Rich	675	2020	31.0	Auto-Rich	450	1430	27.0	Auto-Lean	(Single Speed Blower)	
	B-17	1060	2350	42.0	Auto-Rich	860	2100	35.0	Auto-Rich	645	1840	30.0	Auto-Rich	430	1365	27.0	Auto-Lean	(Low Blower)	
	-52	A-24	(1100)	2550	42.0	Auto-Rich	850	2100	38.0	Auto-Rich	640	1840	31.0	Auto-Rich	425	1365	27.0	Auto-Lean	(High Blower)
	-53	B-18	(1000)	2200	40.0	Auto-Rich	800	2300	35.5	Auto-Rich	600	2020	28.0	Auto-Rich	400	1500	26.0	Auto-Lean	(High Blower)
	-57	Q-47	1060	2350	42.0	Auto-Rich	860	2100	35.0	Auto-Rich	645	1840	30.0	Auto-Rich	430	1365	27.0	Auto-Lean	(Low Blower)
	-60	A-24	(1100)	2550	42.0	Auto-Rich	850	2100	38.0	Auto-Rich	640	1840	31.0	Auto-Rich	425	1365	27.0	Auto-Lean	(High Blower)
R-1820-51		1100	2500	43.5	Auto-Rich	900	2300	37.0	Auto-Rich	675	2020	31.0	Auto-Rich	450	1430	27.0	Auto-Lean	(Single Speed Blower)	
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	-52	A-24	(1100)	2550	42.0	Auto-Rich	850	2100	38.0	Auto-Rich	640	1840	31.0	Auto-Rich	425	1365	27.0	Auto-Lean	(High Blower)
	-53	B-18	(1000)	2200	40.0	Auto-Rich	800	2300	35.5	Auto-Rich	600	2020	28.0	Auto-Rich	400	1500	26.0	Auto-Lean	(High Blower)
	-57	Q-47	1060	2350	42.0	Auto-Rich	860	2100	35.0	Auto-Rich	645	1840	30.0	Auto-Rich	430	1365	27.0	Auto-Lean	(Low Blower)
	-60	A-24	(1100)	2550	42.0	Auto-Rich	850	2100	38.0	Auto-Rich	640	1840	31.0	Auto-Rich	425	1365	27.0	Auto-Lean	(High Blower)
R-1820-51		1100	2500	43.5	Auto-Rich	900	2300	37.0	Auto-Rich	675	2020	31.0	Auto-Rich	450	1430	27.0	Auto-Lean	(Single Speed Blower)	
	B-17	1060	2350	42.0	Auto-Rich	860	2100	35.0	Auto-Rich	645	1840	30.0	Auto-Rich	430	1365	27.0	Auto-Lean	(Low Blower)	
	-52	A-24	(1100)	2550	42.0	Auto-Rich	850	2100	38.0	Auto-Rich	640	1840	31.0	Auto-Rich	425	1365	27.0	Auto-Lean	(High Blower)
	-53	B-18	(1000)	2200	40.0	Auto-Rich	800	2300	35.5	Auto-Rich	600	2020	28.0	Auto-Rich	400	1500	26.0	Auto-Lean	(High Blower)
	-57	Q-47	1060	2350	42.0	Auto-Rich	860	2100	35.0	Auto-Rich	645	1840	30.0	Auto-Rich	430	1365	27.0	Auto-Lean	(Low Blower)
	-60	A-24	(1100)	2550	42.0	Auto-Rich	850	2100	38.0	Auto-Rich	640	1840	31.0	Auto-Rich	425	1365	27.0	Auto-Lean	(High Blower)
R-1820-51		1100	2500	43.5	Auto-Rich	900	2300	37.0	Auto-Rich	675	2020	31.0	Auto-Rich	450	1430	27.0	Auto-Lean	(Single Speed Blower)	
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	-53	B-18	(1000)	2200	40.0	Auto-Rich	800	2300	35.5	Auto-Rich	600	2020	28.0	Auto-Rich	400	1500	26.0	Auto-Lean	(High Blower)
	-57	Q-47	1060	2350	42.0	Auto-Rich	860	2100	35.0	Auto-Rich	645	1840	30.0	Auto-Rich	430	1365	27.0	Auto-Lean	(Low Blower)
	-60	A-24	(1100)	2550	42.0	Auto-Rich	850	2100	38.0	Auto-Rich	640	1840	31.0	Auto-Rich	425	1365	27.0	Auto-Lean	(High Blower)
R-1820-51		1100	2500	43.5	Auto-Rich	900	2300	37.0	Auto-Rich	675	2020	31.0	Auto-Rich	450	1430	27.0	Auto-Lean	(Single Speed Blower)	
	B-17	1060	2350	42.0	Auto-Rich	860	2100	35.0	Auto-Rich	645	1840	30.0	Auto-Rich	430	1365	27.0	Auto-Lean	(Low Blower)	
	-52	A-24	(1100)	2550	42.0	Auto-Rich	850	2100	38.0	Auto-Rich	640	1840	31.0	Auto-Rich	425	1365	27.0	Auto-Lean	(High Blower)
	-53	B-18	(1000)	2200	40.0	Auto-Rich	800	2300	35.5	Auto-Rich	600	2020	28.0	Auto-Rich	400	1500	26.0	Auto-Lean	(High Blower)
	-57	Q-47	1060	2350	42.0	Auto-Rich	860	2100	35.0	Auto-Rich	645	1840	30.0	Auto-Rich	430	1365	27.0	Auto-Lean	(Low Blower)
	-60	A-24	(1100)	2550	42.0	Auto-Rich	850	2100	38.0	Auto-Rich	640	1840	31.0	Auto-Rich	425	1365	27.0	Auto-Lean	(High Blower)
R-1820-51		1100	2500	43.5	Auto-Rich	900	2300	37.0	Auto-Rich	675	2020	31.0	Auto-Rich	450	1430	27.0	Auto-Lean	(Single Speed Blower)	
	B-17	1060	2350	42.0	Auto-Rich	860	2100	35.0	Auto-Rich	645	1840	30.0	Auto-Rich	430	1365	27.0	Auto-Lean	(Low Blower)	
	-52	A-24	(1100)	2550	42.0	Auto-Rich	850	2100	38.0	Auto-Rich	640	1840	31.0	Auto-Rich	425	1365	27.0	Auto-Lean	(High Blower)
	-53	B-18	(1000)	2200	40.0	Auto-Rich	800	2300	35.5	Auto-Rich	600	2020	28.0	Auto-Rich	400	1500	26.0	Auto-Lean	(High Blower)
	-57	Q-47	1060	2350	42.0	Auto-Rich	860	2100	35.0	Auto-Rich	645	1840	30.0	Auto-Rich	430	1365	27.0	Auto-Lean	(Low Blower)
	-60	A-24	(1100)	2550	42.0	Auto-Rich	850	2100	38.0	Auto-Rich	640	1840	31.0	Auto-Rich	425	1365	27.0	Auto-Lean	(High Blower)
R-1820-51		1100	2500	43.5	Auto-Rich	900	2300	37.0	Auto-Rich	675	2020	31.0	Auto-Rich	450	1430	27.0	Auto-Lean	(Single Speed Blower)	
	B-17	1060	2350	42.0	Auto-Rich	860	2100	35.0	Auto-Rich	645	1840	30.0	Auto-Rich	430	1365	27.0	Auto-Lean	(Low Blower)	
	-52	A-24	(1100)	2550	42.0	Auto-Rich	850	2100	38.0	Auto-Rich	640	1840	31.0	Auto-Rich	425	1365	27.0	Auto-Lean	(High Blower)
	-53	B-18	(1000)	2200	40.0	Auto-Rich	800	2300	35.5	Auto-Rich	600	2020	28.0	Auto-Rich	400	1500	26.0	Auto-Lean	(High Blower)
	-57	Q-47	1060	2350	42.0	Auto-Rich	860	2100	35.0	Auto-Rich	645	1840	30.0	Auto-Rich	430	1365	27.0	Auto-Lean	(Low Blower)
	-60	A-24	(1100)	2550	42.0	Auto-Rich	850	2100	38.0	Auto-Rich	640	1840	31.0	Auto-Rich	425	1365	27.0	Auto-Lean	(High Blower)
R-1820-51		1100	2500	43.5	Auto-Rich	900	2300	37.0	Auto-Rich	675	2020	31.0	Auto-Rich	450	1430	27.0	Auto-Lean	(Single Speed Blower)	
	B-17	1060	2350	42.0	Auto-Rich	860	2100	35.0	Auto-Rich	645	1840	30.0	Auto-Rich	430	1365	27.0	Auto-Lean	(Low Blower)	
	-52	A-24	(1100)	2550	42.0														

\* Do not take off in high blower.

NOTE: Operating conditions specified above are for the maximum allowable B.M.E.P. - To decrease wear on engine, decrease manifold pressure and increase R.P.M. - Fuel consumption will increase appreciably.



TABLE A (CONT.)

Engine Designation	Installed Aircraft Designation	TAKE-OFF OR MAXIMUM CONDITION OF OPERATION				NORMAL RATED POWER				MAXIMUM CRUISING CONDITION				DESIRED CRUISING CONDITION				Comments
		Horse Power	Maximum R.P.M.	Maximum Manifold Pressure In. Hg.	Carburetor Mixture Setting	Horse Power	Minimum R.P.M.	Minimum Manifold Pressure In. Hg.	Carburetor Mixture Setting	Horse Power	Minimum R.P.M.	Minimum Manifold Pressure In. Hg.	Carburetor Mixture Setting	Horse Power	Minimum R.P.M.	Minimum Manifold Pressure In. Hg.	Carburetor Mixture Setting	
R-1820-8102A	C-49	1100	2350	43.0	Auto-Rich	900	2300	35.0	Auto-Rich	675	2020	32.0	Auto-Rich	500	1700	25.5	Auto-Lean	(Single Speed Blower)
-0202	C-49	1100	2500	43.5	Auto-Rich	900	2300	37.0	Auto-Rich	675	2020	31.0	Auto-Rich	500	1700	25.5	Auto-Lean	(Single Speed Blower)
-02E	C-49			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
R-2600-3	B-23	(1400)	2400	38.5	Auto-Rich	1200	2300	33.0	Auto-Rich	900	2020	28.0	Auto-Rich	600	1500	25.0	Auto-Lean	(Low Blower)
-8	A-25	(1500)	2800	39.5	Auto-Rich	1300	2400	36.0	Auto-Rich	975	2100	29.0	Auto-Rich	650	1500	25.0	Auto-Lean	(High Blower)
-9	B-25	(1500)	2600	39.5	Auto-Rich	1100	2400	35.0	Auto-Rich	800	2100	29.0	Auto-Rich	550	1560	26.0	Auto-Lean	(High Blower)
-11	A-20, F-3, P-70	(1400)	2400	38.5	Auto-Rich	1200	2300	33.0	Auto-Rich	900	2020	28.0	Auto-Rich	600	1500	25.0	Auto-Lean	(Low Blower)
-13	B-25, B-37, A-35, A-35, A-30, V-72	(1500)	2600	39.5	Auto-Rich	1300	2400	36.0	Auto-Rich	975	2100	29.0	Auto-Rich	650	1500	25.0	Auto-Lean	(High Blower)
-19	A-20, DB-7	(1500)	2600	39.5	Auto-Rich	1300	2400	36.0	Auto-Rich	975	2100	29.0	Auto-Rich	650	1500	25.0	Auto-Lean	(Low Blower)
-23	B-25	(1500)	2600	39.5	Auto-Rich	1300	2400	36.0	Auto-Rich	975	2100	29.0	Auto-Rich	650	1500	25.0	Auto-Lean	(High Blower)
-29		(1500)	2600	39.5	Auto-Rich	1300	2400	36.0	Auto-Rich	975	2100	29.0	Auto-Rich	650	1500	25.0	Auto-Lean	(High Blower)
R-2600-ASB-0	A-206	(1120)	3000	44.0	Auto-Rich	1000	2650	44.2	Auto-Rich	810	2320	37.3	Auto-Rich	500	1850	31.0	Auto-Lean	(Low Blower)
V-1650-1	P-40	(1120)	3000	44.0	Auto-Rich	990	2650	44.2	Auto-Rich	760	2320	36.0	Auto-Rich	495	1850	32.0	Auto-Lean	(High Blower)
V-1710-27	F-4, P-38, P-322			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-29	F-4, P-38, P-322			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-33	P-40			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-35	P-39, P-400			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-37	P-39			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-39	P-40, P-51			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-49	F-4, P-38			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-51	F-5, P-38			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-53	F-4, P-38			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-55	F-5, P-38			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-63	P-39			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-73	P-40			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-81	P-40, P-51			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-83	P-39			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-85	P-39			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-87	A-36			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-89	P-38			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-91	P-38			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-99	P-40			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-111	P-38			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-113	P-38			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														
-115	P-40			USE FUEL, GRADE 91, SPECIFICATION NO. AN-F-26, WITH NO CHANGE IN PRESENT OPERATING INSTRUCTIONS.														

\* Do not take off in high blower.  
 \*\* Do not take off in high blower and do not use high blower below 12000 feet.  
 \*\*\* When ground air temperature exceeds 100° F., reduce manifold pressure for take-off 2" for every 10° F. increase.  
 NOTE: Operating conditions specified above are for the maximum allowable B.M.E.P. - To decrease wear on engine, decrease manifold pressure and increase R.P.M. - Fuel consumption will increase appreciably.



